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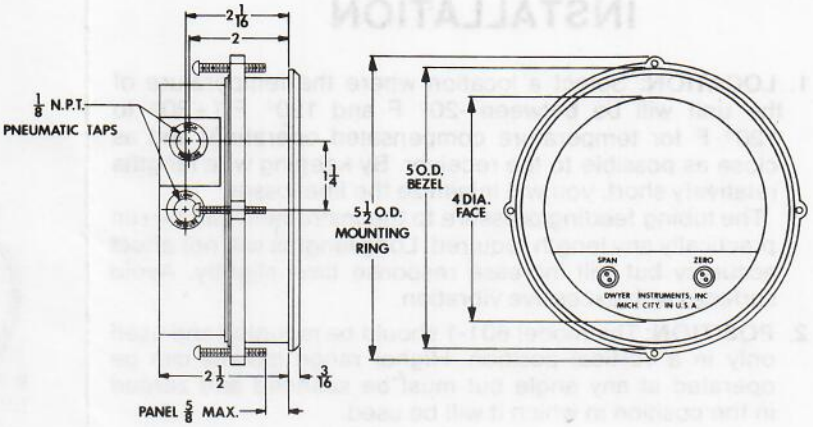
Find the *Dwyer Instruments 601-4* at our website: *Click HERE*

Series 600
Differential Pressure Transducer

Specifications - Installation and Operating Instructions



Patent No. 4,385,525



The Dwyer Series 600 Differential Pressure Transducer converts air or compatible gas pressure into a standard 4-20 milliamp output signal for pressure ranges from 0-.5 in. w.c. up to 0-20 PSI. Each of the models overlap in range so that any desired range within these pressure limits can be achieved by adjustment of the span and zero controls on the front. Positive, negative, or differential pressure can be measured with an accuracy of ±2%. The Series 600 Transducer is based upon the proven Magnehelic gage design and uses several basic components of the indicating gage, thus the resemblance to the Magnehelic family of indicating differential pressure gages. However, the Series 600 Pressure Transducer eliminates the mechanical amplification achieved by the magnet/helix/pointer assembly on the indicating gage and substitutes electrical conditioning and amplification of a resistance change produced by a Wheatstone Bridge strain gage cemented to the range spring which is deflected by the diaphragm in response to pressure. Refer to Bulletin E-50 for additional information on the design, operation, and construction of the Series 600 Differential Pressure Transducer.

STANDARD MOUNTING HARDWARE

Mounting ring
Snap ring
(4) 6-32 x 1-1/4 screws (panel mtg.)
(3) 6-32 x 5/16 screws (surface mtg.)
Washer
1/8" NPT Solid mounting stud
1/8" NPT close nipple
1/8" NPT nut
(2) Tubing to 1/8" NPT adapters
(2) 1/8" NPT plugs

SPECIFICATIONS

GENERAL

Maximum Pressure:	35 PSIG
Media Compatibility:	Air & noncombustible, noncorrosive gases

ELECTRICAL

Power Supply:	20 to 30 VDC, or 18 to 26 VAC, or 15 VDC regulated
Output Signal:	4 to 20 mA DC, 3 or 4 wire
Loop Resistance:	0 to 500 ohms at 15 VDC (4 wire) 250 to 1200 ohms at 30 VDC (3 wire)
Warm-up Time:	5-10 Minutes
Current Consumption:	100 mA min.

MECHANICAL

Weight:	1 lb. 10 oz.
Span & Zero* Adjustments:	Protected potentiometers, externally accessible.
Pressure Connections:	1/8-27 NPT female

PERFORMANCE AT ROOM TEMPERATURE

Zero Output:	4 mA
Full Scale Span:	16 mA
Static Accuracy:	±2% Span
Span & Zero:	Adjustable to 0.05%
Repeatability:	0.5% Span
Resolution:	Infinitesimal

ENVIRONMENTAL

Operating Temperature:	—20 to 120°F (dry air)
Compensated Temperature:	30 to 120°F
Thermal Errors:	±1%/50°F

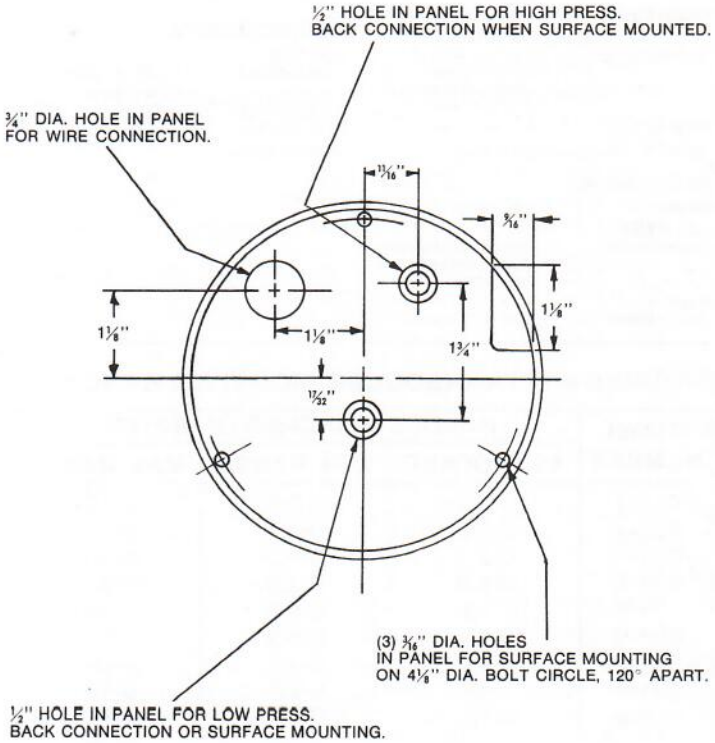
SERIES 600 TRANSDUCER MODELS & RANGES

MODEL NUMBER	RANGES IN INCHES OF WATER		
	AS STOCKED	MIN. RANGE	MAX. RANGE
601-1	0-0.5	0-0.5	0-1.0
601-2	0-1.0	0-0.6	0-1.5
601-3	0-2.0	0-1.0	0-2.8
601-4	0-5.0	0-2.0	0-5.5
601-5	0-10	0-5.5	0-10.5
601-6	0-15	0-8.5	0-22
601-7	0-25	0-14	0-29
601-8	0-40	0-27	0-49
601-9	0-70	0-39	0-70
601-10	0-150	0-60	0-190
	RANGE IN PSI		
601-11	0-20	0-6	0-20

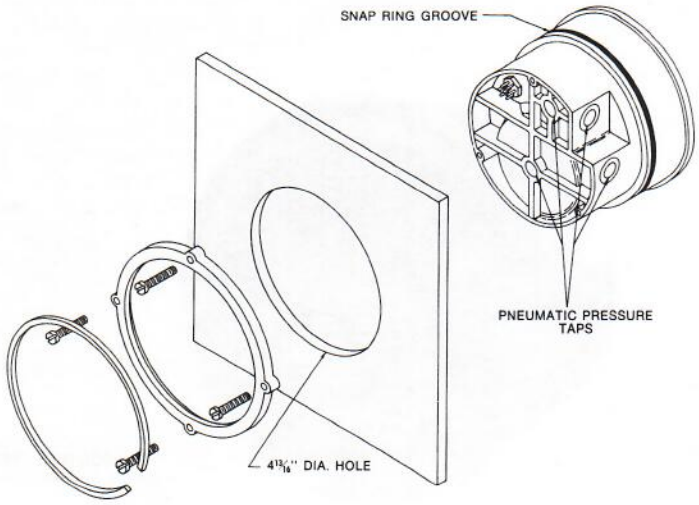
DWYER INSTRUMENTS, INC.
P. O. BOX 373 • MICHIGAN CITY, INDIANA 46360, U.S.A.
Telephone 219/872-9141

INSTALLATION

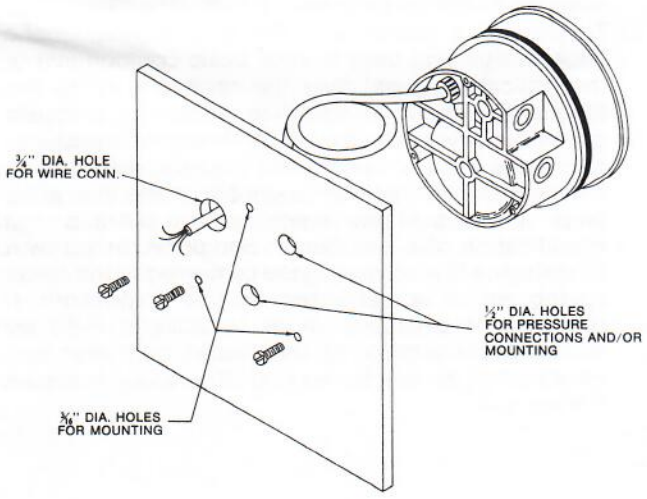
1. **LOCATION:** Select a location where the temperature of the unit will be between -20° F and 120° F (+30° to 120° F for temperature compensated operation) and as close as possible to the receiver. By keeping wire lengths relatively short, you will minimize the line losses.
   The tubing feeding pressure to the instrument can be run practically any length required. Long lengths will not affect accuracy but will increase response time slightly. Avoid surfaces with excessive vibration.
2. **POSITION:** The model 601-1 should be mounted and used only in a vertical position. Higher range models can be operated at any angle but must be spanned and zeroed in the position in which it will be used.
3. **PRESSURE CONNECTIONS:** For convenience, two sets of 1/8" NPT female ports are available. Plug the unused set with pipe plugs provided. Attach tubing from positive pressure source to port marked "HI" or from negative (Vacuum) source to port marked "LOW". In either case, opposite port must be vented to atmosphere. In dusty environments, we recommend use of an A-331 Filter Vent Plug to keep interior of instrument clean. For differential pressures the higher source is connected to the "HI" port and lower to the "LOW" port.



4. **MOUNTING:** The series 600 Transducer may be either panel mounted or surface mounted.



A. **PANEL MOUNTING:** Cut a 4-13/16" dia. hole in panel and insert the complete unit from the front. Slip on the mounting ring and install the split snap ring in the groove on the bezel. Seat the mounting ring against the snap ring and thread the four screws through the tapped holes. Tighten screws against rear of panel.



B. **SURFACE MOUNTING:** Drill (3) 3/16" dia holes for mounting screws and (1) 3/4" dia. hole for wire assembly as shown in hole location drawing. Insert screws from rear of panel and thread into tapped holes on back of transducer case. If rear pressure connections are to be used, make 1/2" dia. holes located as shown in hole location drawing in left column.

If preferred, gage can also be surface mounted by installing either the solid 1/8" NPT stud or close nipple in one port and securing it with a washer and jamb nut from behind panel.

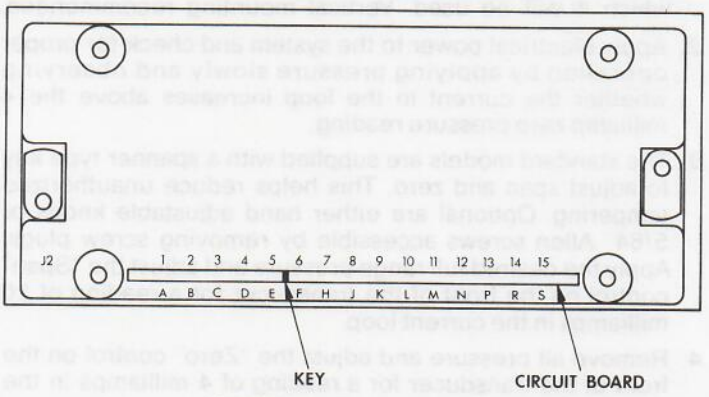
Once transducer unit is securely mounted, plug wire assembly into 7 pin connector on rear of unit, being careful to match pin locations.

CONNECTION TO THE A-701 DIGITAL READOUT ACCESSORY

The Dwyer A-701 Digital Readout provides a 3½ digit LED display of the relative or actual pressure being sensed by the Series 600 Transducer. The A-701 operates directly from standard AC line voltage and contains an AC power supply capable of providing the necessary power to operate the Series 600 Transducer. Thus, these two components make up a complete operating system.

It is suggested that you familiarize yourself in general with the A-701 by reading the instruction bulletin supplied with the readout. A printed circuit board edge connector is supplied with the A-701 to facilitate the electrical connections required. The standard A-701 is supplied to read zero at 4 milliamps and 100.0 at 20 milliamps. Thus, the standard digital display represents percentage of full range pressure being sensed by the transducer. However, the A-701 can also be ranged in the field to any engineering units required. To re-range the display, snap out the front panel and, using a small screwdriver, rotate the screw adjustment "F" at the lower left corner of the LED circuit board until the intended reading at a loop current of 20mA is obtained. With 4mA loop current, check the zero setting. If necessary, rotate the screw adjustment "O" at the lower right corner of the LED circuit board until the display reads zero. Since there is some interaction between these controls, re-check and re-adjust both settings until consistent operation is achieved.

Refer to Figures F and G for connection of the transducer cable to the A-701 edge connector. Once these connections have been made, connect the AC line to the appropriate pins on the edge connector. The installation is completed by the installation of the desired decimal point selection jumper as indicated in the figure. Use care in identifying the appropriate edge connector pins and solder each connection carefully. Use insulated sleeving to cover the completed connections, particularly the AC line connections. Note that the AC line power required is minimal and lighter gage stranded wire is recommended for the AC line connection. Be careful not to bend unused lugs on the edge connector to avoid shorting adjacent connections. Observe the keyway in the circuit board and on the edge connector when installing the connector to the circuit board. Refer to the A-701 instruction manual for mounting and dimension information.



A-701 Pin Designations

NOTE: Pin designations for the edge connector are the same as above when viewed from solder lug side. Designations are also molded into connector body.

FIG. F

TABLE OF CONNECTIONS FROM A-701 TO SERIES 600 TRANSDUCER

Pin 15: AC Line)
Pin S: AC Line) } 115/230 VAC, 50-60Hz
Pin 2: + Signal to Pin E (Green Lead) of Transducer
Pin 10: - Signal to Pin D (Black Lead) of Transducer
Pin 9: AC Power to Pin A (Red Lead) of Transducer
Pin K: AC Power to PIn B (White Lead) of Transducer

DECIMAL POINT SELECTION

No Jumper for 1999
Pin L to Pin N for 199.9
Pin M to Pin N for 19.99
Pin P to Pin N for 1.999

Fig. G

MULTIPLE RECEIVER INSTALLATION

An advantage of the 4-20ma output signal provided by the Series 600 Transducer is that any number of receivers can be connected in Series in the current loop. Thus, an A-701 Digital Readout Accessory, an analog panel meter, a chart recorder, process controlling equipment, (or any combination of these devices) can be operated simultaneously. It is only necessary that these devices all be equipped with a standard 4-20ma input and that proper polarity of the input connections be observed when inserting the device in the current loop. If any of the receiving devices displays a negative or downscale reading, this indicates that the signal input leads are reversed.

MAINTENANCE

Upon final installation of the Series 600 Transducer and the companion receiver, including the A-701 Digital Readout, no routine maintenance is required. A periodic check of system calibration is recommended. The Series 600 Differential Pressure Transducer is not field serviceable and should be returned to the factory if service is required. The A-701 Digital Readout should be returned to the manufacturer if service is required. Refer to the A-701 instruction sheet.

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DWYER INSTRUMENTS, INC.
P.O. Box 373, Michigan City, Indiana 46360, U.S.A.
Phone: 219/872-9141

ELECTRICAL CONNECTIONS

CAUTION: DO NOT EXCEED SPECIFIED SUPPLY VOLTAGE RATINGS. PERMANENT DAMAGE NOT COVERED BY WARRANTY WILL RESULT. THIS UNIT IS NOT DESIGNED FOR AC LINE VOLTAGE OPERATION.

Electrical connections to the Series 600 Transducer are made by means of the cable assembly supplied which has a female plug installed on one end which mates with the male connector on the rear of the transducer. Stripped and tinned leads on the other end of the cable assembly allow connection in a variety of installations. Refer to Figure A for the connector pin layout and connector cable color coding. The schematic diagram of the Series 600 Transducer is illustrated in Figure B.



PIN
D - BLACK
E - GREEN
A - RED
B - WHITE

FIG. A
PIN VS. WIRE COLOR CODE

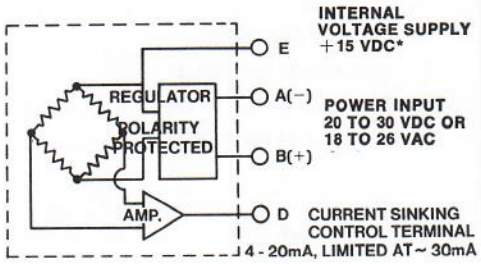


FIG. B

An external power source delivering either 20 to 30 volts DC or 18 to 26 volts AC with a minumum current capability of 100 milliamps must be connected to pins A and B to power the transducer. If an AC power supply is used, polarity of the connections to pins A and B may be disregarded. If a DC power supply is used, the positive lead from the power supply must be connected to pin B and the negative to pin A. Should the polarity be reversed, the transducer will not operate but no damage will be done to the unit. Pin D is the current sinking control and is the return path for current flowing in the loop from the current source through the receiver. Pin E provides a regulated +15 volts DC output to power the current loop when the transducer is connected for four wire operation as illustrated in Figure C. If four wire operation is selected, either an AC or DC power supply can be used but the maximum receiver loop resistance is limited to 500 ohms. In four wire operation, the current loop is powered by the regulated 15 volt DC available at pin E. If three wire operation is desired, Fig. D, an external DC power supply must be used. The current loop derives its power from the external power supply and there is no connection to pin E of the transducer. Three wire operation requires a higher receiver resistance as shown on the graph in Fig. E, the resistance values being a function of the external power supply voltage.

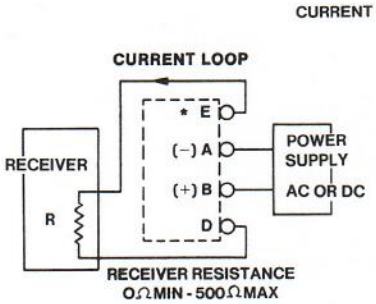


FIG. C — 4 WIRE OPERATION

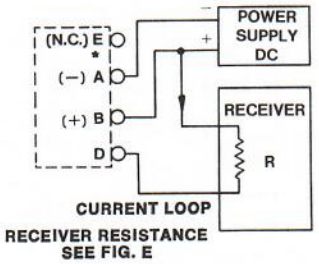


FIG. D — 3 WIRE OPERATION

*NOTE: FOR 15VDC **REGULATED** POWER SUPPLY OPERATION ONLY, USE PIN E FOR POSITIVE CONNECTION RATHER THAN PIN B.

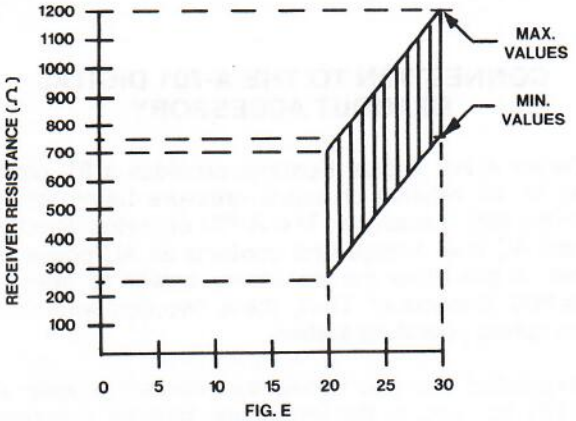


FIG. E

The maximum length of connecting wire between the transducer and the receiver is a function of wire size and receiver resistance. That portion of the total current loop resistance represented by the resistance of the connecting wires themselves should not exceed 10% of the receiver resistance. For extremely long runs (over 1,000 feet), it is desirable to select receivers with higher resistances in order to keep the size and cost of the connecting leads as low as possible. In installations where the connecting run is no more than 100 feet, connecting lead wire as small as No. 22 Ga. can be used.

PRESSURE RANGING

Each Series 600 Transducer is factory calibrated to the range given in the model number chart. However, special calibration is also available. If this is the case, the transducer will be so marked. For purposes of clarification in these instructions, range is defined as that pressure which applied to the transducer produces 20 milliamps of current in the loop. Zero pressure is always assumed to be 4 milliamps.

If a transducer pressure range other than that supplied is required, the following re-ranging procedure should be followed:

1. With the transducer connected to the companion receiver per the instructions above, an accurate milliammeter with a full scale reading of approximately 30 milliamps should be inserted in series with the current loop. A controllable pressure source capable of achieving the desired range should be connected to the high pressure port of the transducer and teed into an accurate reference pressure gage or manometer. Be sure to plug the unused high pressure port and vent at least one low pressure port to atmosphere. The instrument must be ranged in the same position in which it will be used. Vertical mounting recommended.
2. Apply electrical power to the system and check for proper operation by applying pressure slowly and observing whether the current in the loop increases above the 4 milliamp zero pressure reading.
3. The standard models are supplied with a spanner type key to adjust span and zero. This helps reduce unauthorized tampering. Optional are either hand adjustable knobs or 5/64" Allen screws accessible by removing screw plugs. Apply the desired full range pressure and adjust the "Span" control on the front of the transducer for a reading of 20 milliamps in the current loop.
4. Remove all pressure and adjust the "Zero" control on the front of the transducer for a reading of 4 milliamps in the current loop.
5. As the two controls are slightly interactive, repeat steps 3 and 4 several times until readings of 4 and 20 milliamps are obtained consistently.
6. After making the final adjustment of zero and span, back off the knobs slightly to relieve tension in the mechanism. This will minimize future shifts in settings due to shock or temperature changes.
7. Remove the milliammeter from the current loop and proceed with final installation of the transducer and receiver.

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